

Secured Smart Healthcare Monitoring System based on IOT

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ABSTRACT

Technology plays the most important role in healthcare not only for sensory devices but besides in communication, recording and display device. It is very important to monitor various medical parameters and post operational days. Therefore the latest development in Healthcare communication method using IOT is adapted. Internet of things serves as a catalyst for the healthcare and plays prominent role in wide range of healthcare applications. In this project the PIC16F877A microcontroller is used as a gateway to communicate to the various sensors such as temperature sensor, Respiration sensor, Blood Oxygen level and heart beat sensor. The microcontroller picks up the sensor data and sends it to the network through IOT and hence provides real time monitoring of the health care parameters for doctors. The data can be access anytime by the doctor. The controller is in addition connected with buzzer to alert the caretaker about variation in sensor output. Other than the main issue in remote patient monitoring system is that the data as to be securely transmitted to the destination end and provision is made to allow only authorized user to access the data. The security problem is be addressed by transmitting the data through the password protected internet which will be encrypted by standard AES128 and the Doctors can access the records by logging to the html webpage. Next to the instance of extremity situation alert message is send to the doctor through IOT connected to the controller. For this reason quick provisional medication can be easily done by this system. This system is capable with low power consumption capability, easy setup, high performance and time to time response.

Keywords: Internet of Things, PIC microcontroller, IOT, Temperature sensor, Respiration sensor, Blood Oxygen level and Heart beat sensor.

1. INTRODUCTION

Today Internet has become one of the important parts of our daily life. It has changed how people live, work, play and learn. Internet serves for many purpose educations, finance, Business, Industries, Entertainment, Social Networking, Shopping, E-Commerce etc. The next new mega trend of Internet is Internet of Things (IOT). Visualizing a world where several objects can sense, communicate and share information over a Private Internet Protocol (IP) or Public Networks. The interconnected objects collect the data at regular intervals, analyze and used to initiate required action, providing an intelligent network for analyzing, planning and decision making. This is the world of the Internet of Things (IOT). The IOT is generally considered as connecting objects to the Internet and using that connection for control of those objects or remote monitoring. But this definition was referred only to part of IOT evolution considering the machine to machine market today. But actual definition of IOT is creating a brilliant, invisible network which can be sensed, Controlled and programmed. The products developed based on IOT include embedded technology which allows them to exchange information, with each other or the Internet and it is assessed that about 8 to 50 billion devices will be connected by 2020. Since these devices come online, they provide better life style, create safer and more engaged communities and revolutionized healthcare. The entire concept of IOT stands on sensors, gateway and wireless network which enable users to communicate and access the application/information. Be that as it may, among all the regions no place does the IOT offer more prominent guarantee than in the field of health awareness. As a saying goes "Health is wealth" it is

exceptionally crucial to make utilization of the innovation for better wellbeing. Consequently it is obliged to add to an IOT framework which gives secure health awareness checking. So outlining a savvy medicinal services framework where client information is gotten by the sensor and sent to the cloud through Wi-Fi and permitting just approved clients to get to the information.

2. EXISTING SYSTEM

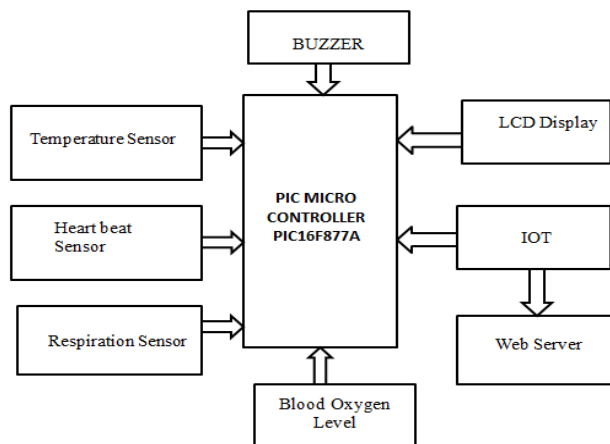
In the Existing System are measuring the health parameters of the patient and send the parameters through the Zigbee, Bluetooth Communication protocol. These protocols have short communication ranges to transmit the data. At any time the doctor the health parameters can't send to the doctor.

3. PROPOSED SYSTEM

The main idea of this system transmitting the data through the webpage to continuous monitoring of the patients over internet. In this system we used PIC16F877A Microcontroller it collects the data from the sensors and sends the data through IOT. The Protected data sent can be access anytime by the doctors by typing the corresponding exclusive IP address in any of the Internet Browser at the end user device (ex: Laptop, Desktop, Tablet, Mobile phone). The Microcontroller is connected to IOT which provides information to doctor/caretaker when the heart rate is greater than 90 or less than 60 and when the temperature is less than 20 or greater than 35. LCD is connected to microcontroller to display the transaction process and healthcare data. And the user interface html webpage will automatically refresh for every 15 seconds for this reason patient health status is continuously

send to the doctor. Therefore continuous monitoring of patient data is achieved.

4. BLOCK DIAGRAM



Wearable Tech



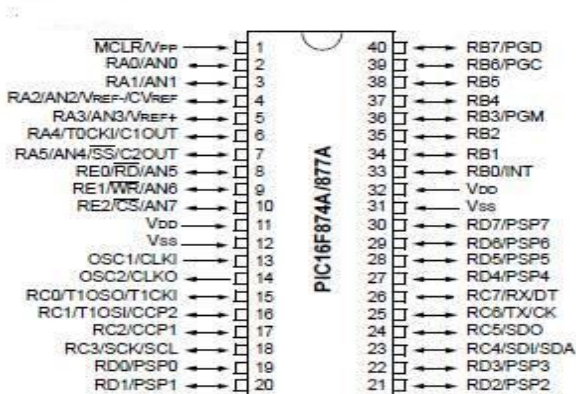
Healthcare



Smart Appliances

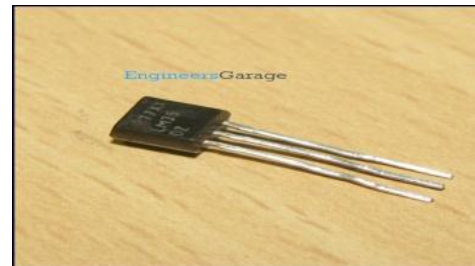
4.1 PIC Microcontroller (PIC16F877A)

Peripheral Interrupt Controller is Microchip product. PIC is a Microcontroller which is something special when compared to others PIC includes features for entire analog as well as digital structure of operations. PIC microcontroller is a improved flash microcontroller. PIC microcontroller mostly compatible with previous versions .It is available in all packages for customer's usage PIC microcontroller available 28/40/44 pins. PIC is a high performance RISC CPU PIC16F877A devices are available in 40-pin in addition to 44-pin packages. The 40/44-pin devices have five I/O ports the 40/44-pin devices have fifteen interrupt the 40/44-pin devices have eight A/D input channels.



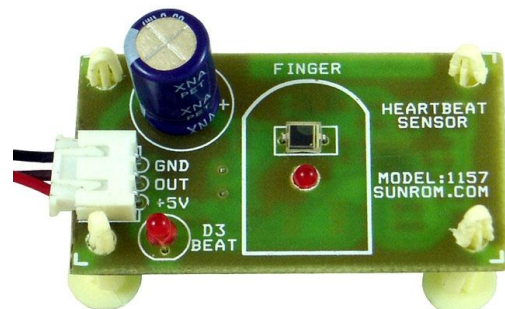
4.2 Temperature Sensor -LM35

The LM35 series are accuracy integrated circuit, whose output voltage is linearly proportional to the Celsius temperature. The Temperature sensor hence has an advantage over linear temperature sensors calibrated in Kelvin like the user is not required to subtract a large constant voltage from its output to convert centigrade scaling. Temperature sensor is a device which senses variations in temperature across it. Temperature Sensor is a basic temperature sensor that can be used for experimental purpose. It gives the readings in centigrade. Since its output voltage is linearly proportional to temperature. It use the fact with the purpose of as temperature increases, the voltage across diode increase at known rate actually the drop across base-emitter junction of transistor.



4.3 Heart Beat Sensor

Heart beat sensor is designed to give digital output of heart beat when a finger is placed on it. When the heart beat detector is working, the beat LED flashes in unison with each heart-beat. This digital output can be connected to microcontroller directly to measure the Beats per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.



4.4 IOT

The IOT is usually consider as connecting things to the Internet and using that connection for control of individuals objects otherwise remote monitoring. The products urbanized based on IOT include embedded technology which allow them to exchange information, through each additional the Internet and it is assess that about 8 to 50 billion devices will be connected by 2020 because these devices come online, they provide improved life style, construct safer and more engaged communities in addition to revolutionized healthcare. It's just one more computer right all of the same issue we have with access control, vulnerability management, patching, monitoring, etc. Envision your network with 1,000,000 more devices. Some compromised device is a foothold on the network.

4.5 Respiration Sensor



Respiration sensors can be calculated by means of an inductive or resistive respiration belt, moreover by means of measuring the EMG of the diaphragm. For several medical purposes, the respiration of a patient needs to be measured. Sometimes we want to have an impression about the pulmonary function, sometimes we just want to detect and calculate the amount of apneas. We have both inductive and resistive respiration belts available for the measurement of respiration. Next to that it is also possible to measure the nasal airflow by means of our differential pressure sensors.

4.6 Blood Oxygen Level

While most people are concerned over vital signs including their pulse, temperature, blood pressure and respiratory rate, a little less understood percentage that refers to the fraction of Per science when measuring fitness levels of an individual is the idea of measuring one's blood oxygen level. Oxygen saturation is presented in the form of an Oxygen Saturated hemoglobin that is relative to the total hemoglobin, unsaturated and saturated, in the blood. In simpler terms, it is the level of oxygen available in the blood. If the individual is now good health, normal blood oxygen levels approximately always fall within a very conventional range connecting 95% to 100%. This means that the body is getting sufficient oxygen to be able to make the necessary basic functions furthermore that the internal organs are performing at their most excellent. Not only to blood oxygen levels in the body also has an effect on how effective workout session.

5. CONCLUSION AND FUTURE WORK

With the wide use of internet this work is focused to implement the internet technology to establish a system which would communicate through internet for better health. Internet of things is expected to rule the world in various fields but more benefit would be in the field of healthcare. Hence present work is done to design an IOT based smart healthcare system using a PIC16F877A microcontroller. In this work the MCP6004 based Heart Beat Sensor is designed and temperature sensor is used to read the temperature and heart rate of the patient and the microcontroller picks up the data and send it through Internet. The data is also sent to the LCD for display so patient can know his health status. During extreme conditions to alert the doctor warning message is sent to the doctor's cell phone through GSM modem connected and at the same time the buzzer turns to alert the caretaker.

The doctors can view the sent data by logging to the html webpage using unique IP and page refreshing option is given so continuously data reception achieved. Hence continuous patient monitoring system is designed. The Future work of the project is very essential in order to make the design system more advanced. In the designed system the enhancement would be connecting more sensors to internet which measures various other health parameters and would be beneficial for patient monitoring i.e. connecting all the objects to internet for quick and easy access. Establishing a Wi-Fi mesh type network will increase the communication range.

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